

out touching the anthers. A monopoly of the flowers by them would probably result in a functional dioecism, characterized by long-styled staminate and short-styled pistillate flowers.

The plant blooms from May 19th to June 30th. The list was observed on 6 days, between May 25th and June 12th.

Hymenoptera—*Apidae*: (1) *Apis mellifica* L. ♀, s.; (2) *Synhalonia honesta* Cr. ♂, s.; (3) *Ceratina dupla* Say ♂♀, s. and c. p., ab.; (4) *Heriades carinatum* Cr. ♂ s.; (5) *Calliopsis andreniformis* Sm. ♂♀, s. and c. p., ab.; *Andrenidae*: (6) *Augochlora pura* Say ♀, s. and c. p.; (7) *Halictus ligatus* Say, ♀, s.; (8) *H. pilosus* Sm. ♀, s. and c. p.; (9) *H. confusus* Sm. ♀, s. and c. p.; (10) *H. albipennis* Rob. ♀, s. and c. p.

Diptera—*Syrphidae*: (11) *Paragus bicolor* F., s.; (12) *P. tibialis* Fll., s.; (13) *Mesograpta marginata* Say, s.; (14) *Sphaerophoria cylindrica* Say, s. and f. p., ab.; (15) *Syritta pipiens* L., s.

Lepidoptera—*Rhopalocera*: (16) *Pieris protodice* B.-L.; (17) *Chryophanus thoe* B.-L.; (18) *Ancyloxypha numitor* F., ab.; (19) *Pholisora catullus* F. —all sucking.

Coleoptera—*Scarabæidae*: (20) *Trichius piger* F., s., ab.; *Curculionidae*: (21) *Centrinus scutellum-album* Say, s.; (22) *Stethobaris* sp., s.

Carlinville, Ill.

### Botanical papers read before Section F, A. A. A. S., Rochester meeting.

N. L. BRITTON: "*Notes on Ranunculus repens and its eastern North American allies.*"—Attention was called to the group relationship that evidently exists between the European *R. repens* and such American species as *R. hispidus* Mx., *R. fascicularis* Muhl., *R. septentrionalis* Poir., *R. palustris* Ell. (a somewhat doubtful southern species), and the British Columbian *R. Macounii* Britton. Illustrated by specimens.

N. L. BRITTON: "*Notes on a monograph of the North American species of Lespedeza.*"—The author believes that it would facilitate the study of these species to recognize a greater number of species than heretofore, instead of considering some of them forms. Illustrated by numerous specimens.

W. W. ROWLEE: "*The root-system of Mikania scandens.*"—*Mikania* develops a great number of roots under water which never reach the soil. The greatest development of these is



during and after anthesis, in autumn, when the root-branching is immense. These roots come to the surface and either float or rise above it. If the water rises above them they grow longer. When transplanted to dry conditions the same root-system is developed. The rootlets, however, are not so long, but stop just above the surface of the ground, forming multitudes of little "knees" about an inch or less in height. A peculiar anatomical structure is found in the presence (in section) of four peculiarly modified cells, two of which belong to the endodermis and two to the row of cells just outside. These cells always lie in contact with the phloem cells and are so arranged as to enclose a rectangular intercellular space of considerable size and definite shape. They have large nuclei which are always upon the side of the cell next to the intercellular space. These spaces extend to very near the growing point of the root, thus forming long tubes. This, taken in connection with the peculiar development of the roots and their place of growth, is strong evidence in favor of their performing the function of aeration.

L. M. UNDERWOOD: "*Preliminary comparison of the hepatic flora of boreal and sub-boreal regions.*"—To be published in full in the GAZETTE.

E. F. SMITH: "*On the value of wood-ashes in the treatment of peach-yellows.*"—This well-known treatment had been fully tested, and was found inefficient in all doses. The conclusion was that peach-yellows cannot be cured or prevented by wood-ashes.

E. F. SMITH: "*On the value of superphosphates and muriate of potash in the treatment of peach-yellows.*"—This mixture is that recommended by Profs. Goessmann and Penhallow. It was tested for three years, 1889-1891, and no benefit was discovered. In fact, the treatment seemed rather to favor the disease than otherwise. It was remarked that well-fed plants may become diseased quite as readily as weak plants.

G. MACLOSKIE: "*Notes on maize.*"

W. J. BEAL: "*Spikes of wheat bearing abnormal spikelets.*"—Spikes of Missouri wheat, Champion Amber, Early Red Clawson, and several others, bear spikelets either rudimentary or perfect near those normally appearing. These are much like reduced forms of miracle or Egyptian wheat, in which the spikes are branched. Illustrated by specimens.

W. J. BEAL: "*A study of the relative lengths of the sheaths and internodes of grasses for the purpose of determining to*



*what extent this is a reliable specific character.*"—Some agrostologists use this character and some do not. From 10 to 30 plants in each of 47 species were examined, and the internodes and sheaths measured and tabulated. The character proved good in 35 species. In very variable species it is of less importance, and in no case would it be safe to rely upon one or two stems alone. The sheaths and internodes of very tall specimens or very short ones are usually much less reliable for specific characters than those of medium height. The second and third sheaths and internodes from the top are more reliable for this purpose than the others. Illustrated by seven charts.

W. W. ROWLEE: "*Adaptation of seeds to facilitate germination.*"—The most critical time in the life history of the plant is when the embryo is dormant in the seed. Hence it is to be expected that all modifications of the seed have some explanation in the economy of its existence. Careful observation of the germination of seeds of native plants shows that few seedlings are produced. Fruits of *Acer dasycarpum* are held upright by the wing when falling in grass or rubbish. Planting seeds below the surface of the ground showed that twice as many seeds grew when planted with radicle down as with radicle up. The paper was followed by an interesting discussion concerning the struggle for existence and the vitality of seeds.

H. L. RUSSELL: "*Bacteriological investigations of marine waters and the sea floor.*"—To be published in full in the GAZETTE.

F. V. COVILLE: "*Sketch of the flora of Death Valley, California.*"—The paper was introduced by a general statement of the topography of Death Valley. The absence of trees was spoken of and the characteristics of other vegetation. Lists of species were arranged by groups, with an account of the special adaptation of species to desert conditions. In conclusion the geographical relationship of the flora was discussed.

J. C. ARTHUR: "*How the application of hot water to seed increases the yield.*"—To be published in full in the GAZETTE.

M. MILES: "*Heredity of acquired characters.*"—Weismann's theory of the continuity of a stable, immortal germ-plasm that is independent of the body-plasm, and transmitted without change from one generation to another, is not warranted by the known facts of physiology, and it cannot,



therefore, be accepted as proof that acquired characters are not hereditary. The transformations of matter and energy in the metabolic processes of nutrition, in plants and animals, as now interpreted by physiologists, must extend to the growth and development of the germ-cells, which are thus brought into intimate relations with the metabolism of every part of the body. The general course and results of the processes of nutrition are essentially the same in plants and animals. The food constituents, in the first place, are built up into protoplasm, with a storing of energy as an indispensable condition of its constitution; and the various tissues and constituents of the organism, including the germ-cells, are then formed as products of its destructive metabolism, with a liberation of a portion of the stored energy in the form of heat. Established habits of the system, or of particular organs, and changes in the environment including conditions of food-supply, have an influence on the general and special processes of metabolism of the system, in which the germ-cells are involved, and the hereditary transmission of the modified habits of the organism are thus provided for. The non-appearance of any peculiarity of the parent in the next generation cannot be accepted as evidence that it has not been transmitted, as it may be obscured and made latent through the dominant influence of other characters, as in the well known facts of atavism. Morphological characters are not more important factors in evolution than the functional activities and bias of the organism on which they depend for their origin and development. The transmission of a morphological character must consist in a transmitted functional activity of the organism that determines the development of the morphological peculiarity under favorable conditions for its exercise. In addition to these physiological considerations, evidence of the heredity of acquired characters was presented in the results of direct experiment, and observations in the breeding and improvement of domestic animals.

L. H. BAILEY: "*On the supposed correlation of quality in fruits—a study in evolution.*"—It is commonly supposed that as quality in cultivated fruits increases various other characters, as size, color, and vigor of plant, decrease. The question is a philosophical one, for its answer must determine whether cultivated plants are subject to the same laws of variation as their wild congeners, whether all characters vary independently, or whether cultivation introduces some



new law of progression in parallelisms. The subject is approached by a study of the scales of points used in the best fruit-lists, by which it becomes apparent that all desirable qualities often appear in the same variety of fruit, and that many of our best market-fruits are also best for the dessert. The best records show that diminished size, low color, comparative seedlessness, tenderness of tree, and lessened vigor, are not correlated with high flavor. It is also shown that there is no loss of sweetness or aroma in domesticated fruits which is due to cultivation and amelioration. It is evident from the whole discussion that quality and other characters of cultivated fruits appear independently of each other, that there is no correlation between these characters. There is general increase in all characters as amelioration progresses, at least in all characters which are particularly sought by horticulturists; and this fact must ever remain the chief inspiration to man in the amelioration of plants.

H. L. RUSSELL: "*Non-parasitic bacteria in vegetable tissue.*"—Experiments were made by infecting healthy plants with various species of bacteria, saprophytic as well as those that are pathogenic for animals, to see (1) the effect of any of these micro-organisms upon the plant, and (2) the reciprocal effect of the host upon the micro-organism. The conclusions reached were that healthy plant-tissues, like animal tissues, are normally free from bacteria; but that, unlike the animal tissue, many micro-organisms are able not only to exist within the tissues of plants, but possibly possess some powers of multiplication.

W. A. KELLERMAN: "*Note on yellow pitch pine.*"—A well marked form of pitch pine was recently found in Fairfield county, Ohio, which may be characterized as *P. rigida* var. *lutea* Kellerman. It differs in the thinner scarcely furrowed reddish-yellow bark, and in the deeper yellow more durable and more distinctly marked heartwood. It occurs with the species, yet appears quite distinct. The form is easily recognized by sight, and is not a mere lumberman's questionable distinction.

W. A. KELLERMAN: "*Germination at intervals of seed treated with fungicides.*"—Experiments in connection with a study of fungicides for smut of oats have shown that seed treated with hot water and solutions of potassic sulphide germinate more quickly than untreated seed. Dr. Arthur has also shown that such treated seeds would continue to



germinate more quickly after a considerable period of time had elapsed. Experiments touching this were instituted, with the following results: (1) That germination of treated seed is more rapid than of untreated seed immediately after treatment; (2) that this action continuously declines with time and the germination is ultimately less rapid and inferior.

M. B. WAITE: "*The fertilization of pear flowers.*"—A brief general account was given of a large series of experiments on the fertilization of pear flowers. Abundant insect visitors were noted and the effect on them of climatic conditions. The general conclusions were: (1) Some cultivated varieties of pear are capable of self-fertilization, but the majority are not; (2) cross-fertilization is effected by insects; (3) cross-fertilization, at least the kind required for the setting of fruits, consists in crossing one horticultural variety with another, and not in crossing one tree of a certain variety with another of the same name.

C. V. RILEY: "*The fertilization of the fig and caprification.*"—A résumé of the subject of caprification in the older countries was given, showing its importance and necessity in the cultivation of the best Smyrna figs, with a statement of the differences between the Smyrna and Adriatic figs. The author considered the question of the importation of *Blastophaga psenes* for the fig-growers of California, and pointed out how it could be successfully done. He touched on the erroneous notions that have been published on the subject, and finally considered the caprifig insects associated with the wild figs of North America, characterizing some fourteen of them from Florida, Mexico and St. Vincent.

F. B. MAXWELL: "*A comparative study of the roots of Ranunculaceæ.*"—The paper contained the results of the examination of the roots of about thirty species native to the northern United States, including a comparative study of the apical meristem and of the changes taking place through secondary growth. Authorities on meristem structure have assigned the roots of this order to a single type; while the author finds two principal types, each including a considerable number of species. It is usually assumed that secondary changes take place to a greater or less extent in mature roots of dicotyledons; but the author finds in many Ranunculaceæ that the primary structure persists in the older roots. On the basis of changes taking place through secondary growth, the author made three classes for the roots studied.



O. F. COOK: "*Do termites cultivate fungi?*"—In the nests of Liberian species of *Termes* are found honeycombed masses of a punk-like substance, irregularly rounded in general shape. Over all the surfaces and passages of this material there grows the mycelium of a mucor-like fungus, having white sporangia about 5 mm. in diameter. The young termites apparently feed upon these fungi. A similar condition of things obtains with another species of *Termes* living underground.

JAMES H. STOLLER: "*The conditions which determine the distribution of bacteria in the water of rivers.*"—In the author's absence the paper was read by title.

WILLIAM P. WILSON: "*Adaptations of plants to environment.*"—A comparison of lowland vegetation near the sea with that of desert and mountain areas. A large number of lantern slides were shown, illustrating the ways in which plants of these regions protect themselves against excessive evaporation, particularly by change in position of foliage. In such leaves the author found no change in the position of the chlorophyll bodies. The stomata in the exposed leaves were closed, while those in shaded leaves were open.

S. A. BEACH: "*Notes on self-pollination of the grape.*"—The author showed that the proper time for examining grape-buds to determine whether self-pollination occurs before the flowers open is just at the time when dehiscence of the calyx begins. Clusters of grapes were enclosed in bags before blossoming to prevent the access of foreign pollen. Self-pollination was observed in seventy-seven individuals, distributed among eight species and their hybrids and crosses.

GEO. B. SUDWORTH: "*The comparative influence of odor and color of flowers in attracting insects.*"—Attention was called to a supposed development from a low to a high grade in the colors of flowers, ranging from "the simplest, yellow; 2nd, white; 3d, pink to red; 4th, the most perfect color, blue." The author spoke of his own experiments and those of others, which seem to prove that nectar-gathering insects of higher order (honey bees, etc.) show a preference for the colored flowers of higher grade. He believes, however, that the comparative attractability of color is less powerful in its influence upon insects than that of odor, his experiments showing, first, that the honey bees work persistently upon syrup scented with an artificial sweet odor (anise), but refuse to take the



same sweet when unscented; and second, that color does not attract insects at all when tested equally with an odor, the supply of sweet to be obtained in connection with the color and odor tests being equal in both cases.

CHAS. W. HARGITT: "*Notes on Daucus Carota.*"—In the author's absence the paper was read by title and will be published in full in the GAZETTE.

FREDERICK V. COVILLE: "*Geographical relationship of the flora of the high Sierra Nevada, California.*"—A list of the representative species of the high Sierra Nevada was given, and also a comparison of these plants with those found in the Rocky Mountains and the Cascades. This comparison indicated (1) a large endemic flora of the Sierra Nevada, (2) a group of species common to all these ranges; (3) a group of species common only to the Sierras and Cascades; (4) a group common only to the Sierras and Rockies.

W. M. BEAUCHAMP: "*Variation in native ferns.*"

DAVID G. FAIRCHILD: "*Live-for-ever eradicated by a fungous disease.*"—Attention was drawn to a new species of fungus which since 1887 has been in use among the farmers of Cortland Co., N. Y., in the eradication of a most troublesome weed, (*Sedum Telephium*). A short history of the successful use of this disease was given, with a brief description of the parasitic fungus which causes the destruction of the plants. Attention was called to a new mode of spore-formation connected with the production of the macrospore of this fungus.

GEORGE VASEY: "*Otto Kuntze's changes in the nomenclature of North American grasses.*"—In the author's absence this paper was read by title.

B. E. FERNOW and GEO. B. SUDWORTH: "*Revised nomenclature of the arborescent flora of the United States.*"—The paper points out the practical bearing and importance of the question of nomenclature, and suggests certain principles intended to secure fixity.

C. V. RILEY: "*On Carphoxera ptelearia, the new herbarium pest.*"—In the author's absence the paper was read by title.

FREDERICK V. COVILLE: "*Characteristics and adaptations of desert vegetation.*"—The author spoke of the source and distribution of moisture, its conservation, the temperature, and the seasons. A list of species of the Mohave desert, arranged by groups, was given, with a discussion of general and particular adaptations.



FILIBERT ROTH: "*Shrinkage of wood as observed under the microscope.*"—In the author's absence the paper was read by title.

L. H. PAMMEL: "*Peziza sclerotiorum*;" and "*Temperature and some of its relations to plant life.*"—In the author's absence these two papers were read by title.

BYRON D. HALSTED: "*Pleospora of Tropæolum majus.*" A fungus of the *Alternaria* type was found upon the foliage of a garden nasturtium, associated with the perithecia of a *Pleospora*. Cultures upon slant agar tubes were made of the *Alternaria* spores and a pure growth of the black mould obtained, followed by the ascigerous form *in* and not upon the surface of the agar. The perithecia were of many and strange shapes, not at all resembling those of the leaves except in the cellular structure of the wall and the size and shape of the spores. This was an unusual instance of the direct modifying effect of the surrounding media upon the size and form of the perithecia. The species is apparently new and may be called *Pleospora Tropæoli*.

BYRON D. HALSTED: "*Secondary spores of anthracnoses.*"—A study of the germinating spores of species of anthracnose shows that the formation of "special cells" or "secondary spores" is probably confined to two genera, viz: *Glœosporium* and *Colletotrichum*. They seem to be constantly present in these two genera. Those conditions which are not especially favorable for the production of ordinary spores are well adapted to the formation of secondary ones. There is some uniformity in the color and shape of the special cells, but more in the position they occupy upon the filament. The nature of these cells is not easily determined. They seem to be bodies for enduring periods unfavorable for the growth of the fungus. These cells sometimes increase in number and form a sclerotium, as is well known among some other fungi.

BYRON D. HALSTED: "*A bacterium of Phaseolus.*"—The paper announces the discovery of a new bacterial disease of beans, the species is characterized, and the name *Bacterium Phaseolum* proposed.

THOMAS MEEHAN: "*The significance of cleistogamy.*"—In the author's absence the paper was read by title.